Operating Instructions

TEST GEAR G. QUIRK -

D.C. CHOKE ADAPTOR

Type TM 6113

MARCONI INSTRUMENTS LIMITED, ENGLAND

EBM 6113
1 - 11/60

OPERATING INSTRUCTIONS

for

D.C. CHOKE ADAPTOR

TYPE TM 6113

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DRAWINGS

CIRCUIT DIAGRAM..... Drawing No. XC 31308

1 GENERAL

The D.C. Choke Adaptor is intended for use with Marconi Instruments Universal Bridges of the TF 868 Series, Type TF 2700, or 1/4% Universal Bridge Type TF 1313. It enables inductance measurements to be carried out on chokes or transformer windings while they are carrying a polarizing direct current of up to 200 mA.

Basically, the adaptor comprises :-

(a) An isolating capacitor to prevent the d.c. from flowing through the measuring circuits of the bridge. This capacitor is effectively in series with the inductor under test and its value is sufficiently large to offer a very low reactance at the 1-kc/s test frequency. It does, however, set a lower limit to the inductance which can be measured; at 100 mH its approximate effect is to produce an apparent decrease in inductance of 0.3%, while at 10 mH this effect would be about 3%.

(b) Two tuned circuits which isolate the 1-kc/s test frequency from the shunting effects of the d.c. supply. The inductors in these tuned circuits are connected in series with the inductor under test - one in each d.c. supply lead. Their construction is such that their inductance remains relatively constant despite the d.c. polarizing current.

One tuned circuit shunts the Lo or DET terminal of the bridge to earth, thus tending to reduce the sensitivity. This effect may be noticed on the higher inductance ranges, but no inaccuracy is introduced.

The other tuned circuit is connected across the main BALANCE resistor within the bridge, and is therefore more ciritical with regard to measurement accuracy. When exactly at resonance the impedance presented by a tuned circuit is purely resistive, and it is under these conditions that the BALANCE circuit is intended to operate.

1 GENERAL (continued)

To accommodate frequency variations between individual bridges, the fine tuning of this critical circuit is left to the operator who must adjust the "Q Trimmers" to suit the frequency of the actual bridge used. Once set to a particular bridge frequency, there is no need for further readjustment unless a different bridge is used.

The "Q Trimmers" are so called because their correct adjustment is essential if accurate Q readings are to be obtained.

2 ADJUSTMENT OF Q TRIMMERS

Although there is negligible effect on the accuracy of inductance measurement, the adjustment procedure relies upon the sensitivity of Q measurement to reactive shunts across the BALANCE control, i.e., from Hi to Earth.

The method, described on the adaptor itself, is also given below :-

(1) With the adaptor disconnected, measure an inductor on the bridge. Note the control settings and leave the inductor in place.

(2) Join the E terminal on the adaptor to an earth point on the bridge; the location of this earth point is not important.

(3) Join the brown (Hi) adaptor lead to the Hi terminal on the bridge. This will usually cause a change in balance as indicated on the meter. Minimize this change by operating the "Q Trimmers" - a small alteration of the BALANCE control will also be required for true balance. If the bridge frequency is further off tune than the limits of the Q trimmers permit, then a readjustment of the Q control on the bridge will also be necessary.

(4) Finally disconnect the inductor and connect the screened Lo lead from the adaptor to the Lo or DET terminal on the bridge.

Chokes may now be measured, with appropriate d.c. polarization, by connecting them across the Hi and Lo terminals on the adaptor. The normal bridge controls should be used without further re-adjustment of the Q Trimmers.

3. ACCURACY

Without very careful precautions it is not easy to obtain consistently accurate measurements of the inductance of ordinary transformers and chokes with laminated cores. The readings of inductance will often be found to vary according to their position relative to earthed objects, mains power leads etc. Movements of their leads can also affect the answer.

These effects are due to imperfections of ordinary iron alloys as a core material and to stray capacity between the leads. The errors are, in general, proportional to the inductance.

When measuring chokes in excess of about 20 H, slight residual coupling between the tuned circuits in the adaptor may give rise to a false balance. Careful arrangement and screening however have reduced the largest error at 100 H to approximately 10%. This error reduces with reduced inductance to an error not, in general, exceeding 3% at 20 H and below. Q-accuracy, however, degenerates progressively above about 10 H - but this is a requirement that is seldom encountered.

A B C

1 2 3 4 5

TITLE

DIRECT CURRENT CHOKE ADAPTOR CIRCUIT DIAGRAM

DRAWN	DATE	CHKD	APPD.	TRCD.	ASSEMBLY	STOCK LIST	DRAWING NUMBER
D.J.WILLIAMS	27-5-64				TD31304	TM6113	XC31308

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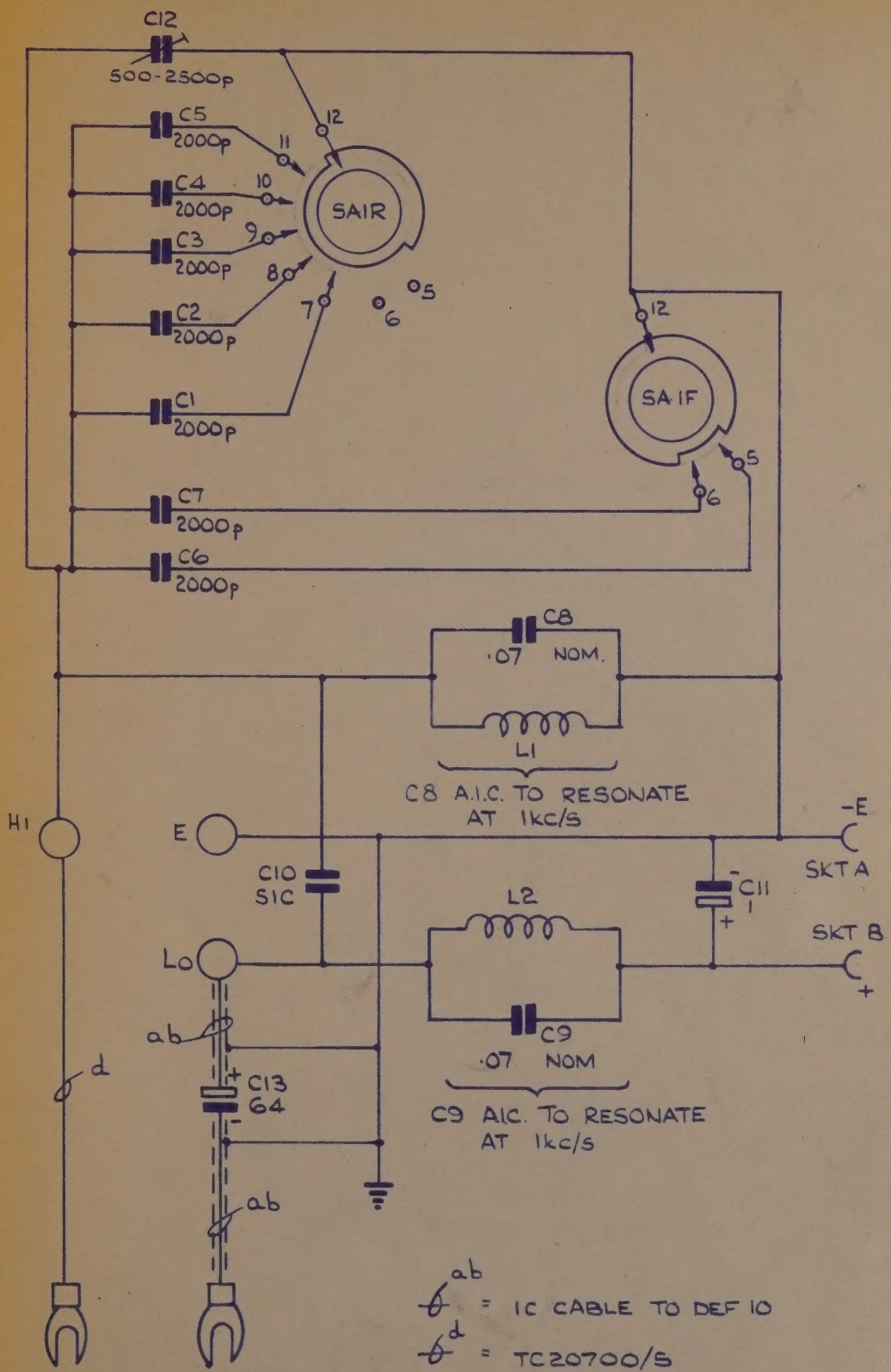
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C5
2000p
C4
2000p
C3
2000p
C2
2000p
C1
2000p
C7
2000p
C6
2000p
SA IR
SA IF
12
11
10
9
8
7
6
5
C8
·07 NOM.
L1
C8 A.I.C. TO RESONATE AT 1kc/s
H1
E
-E
SKT A
SKT B
+
C10
S1C
C11
1
L2
Lo
ab
d
C13
64
C9
·07 NOM
C9 A.I.C. TO RESONATE AT 1kc/s
ab = 1C CABLE TO DEF 10
d = TC20700/S

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